



Technology Demonstration Summary Sheet

Empore™ Membrane Separation Cartridge

THE NEED

High-capacity water treatment methods are needed which concentrate contaminants and generate smaller volumes of secondary wastes. Large volumes of water that contain low levels of radioactive contaminants stored in nuclear facilities will have to be treated prior to final release from the facility. There is also a need to treat and/or recycle secondary decontamination effluents resulting from D&D activities.

THE TECHNOLOGY

The Empore™ membrane separation technology has been developed by 3M and provides a method for enmeshing sorbent surface-active particles in a web-like matrix. This matrix material is formed into a membrane which has good integrity and handling strength, and a high particle surface availability. The membrane is configured into a cartridge, which is then installed in commercially available filter housings, and used for processing water. Sorbent particles can be placed in the membrane to selectively remove specific contaminants. This technology provides the capability to remove contaminants down to detection levels at high flow rates.



Demonstration Rig in Operation at CP-5

THE DEMONSTRATION

In September 1996, the Empore™ cartridges were used to process storage pool water at the Argonne National Laboratory's CP-5 Reactor D&D Project as part of the CP-5 Large Scale Demonstration Program funded by DOE's Federal Energy Technology Center (FETC) for the D&D

Focus Area. Activated materials and other items that were used to support reactor operations prior to D&D are stored in the pool. The primary radioactive contaminants in the water are Co-60, Cs-137 and tritium. Conventional filters were used to remove particulate from the water upstream of the Empore™ cartridges. Three different types of sorbent particles were used in three successive Empore™ cartridges to remove soluble cesium and cobalt from the water as follows: potassium cobalt hexacyanoferrate, a proprietary anion resin, and the Diphonix® resin available from Eichrom Industries.

THE RESULTS

Initial analysis of output water samples from the demonstration apparatus indicated Cs-137 and Co-60 concentrations of less than 0.02 pCi/ml. Approximately 4500 gallons of water were treated during the demonstration. The results will be used to scale the technology up to a larger capacity system.



Empore™ Cartridges After Use (Foreground)

CONTACTS

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CP-5 LARGE SCALE DEMONSTRATION PROJECT

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